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A method and system for the insertion of local signals, including digital media advertisements, into statistically multiplexed streams is presented. The rate control and timing information is computed and is used to specify the insertion time and rate parameters for digital advertisements. In one embodiment, a maximum bit rate over the advertisement duration is specified. The maximum bit rate may be constant or may vary in time, such that high bit rate portions of the advertisement are supported. High bit rate portions of the advertisements in different program streams may be staggered, such that the total bandwidth required does not exceed a maximum, but allowing for high bit rate portions of advertisements. Custom bit rate profiles for advertisements may also be defined, with the profiles being defined at a high granularity or a low granularity.